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Spatially Resolved Nano-Scale Characterization of Electronic States in SrTiO₃(001) Surfaces by STM/STS KATSUYA IWAYA, TAKEO OHSAWA, RYOTA SHIMIZU, Tohoku University, TOMIHIRO HASHIZUME, Hitachi, Ltd., TARO HITOSUGI, Tohoku University, TOHOKU UNIVERSITY COLLABORATION, HITACHI, LTD. COLLABORATION, TOKYO INSTITUTE OF TECHNOLOGY COLLABORATION, JAPAN SCIENCE AND TECHNOLOGY AGENCY COLLABORATION — We have performed low temperature scanning tunneling microscopy/spectroscopy (STM/STS) measurements on TiO₂-terminated SrTiO₃(001) thin film surfaces. The conductance map exhibited electronic modulations that were completely different from the surface structure. We also found that the electronic modulations were strongly dependent on temperature and the density of atomic defects associated with oxygen vacancies. These results suggest the existence of strongly correlated two-dimensional electronic states near the SrTiO₃ surface, implying the importance of electron correlation at the interfaces of SrTiO₃-related heterostructures.

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